Prediction of geometric defects in the cold embossing of AA6061 aluminium alloy by finite element analysis.

Abstract

The precision of near-net shape manufacturing processes such as cold forging is crucial. Defects may affect the assembly accuracy and thus cause decreased system performance. Therefore, these defects must be predicted and minimized as early as possible before proceeding to the manufacturing stage. This paper aims to study the geometric defects in the cold embossing pin head. The defects can be measured based on the incomplete filling and geometries of bulging. The effect of the distance to edge (DTE) on the defect pattern is predicted based on the material flow pattern. The DTE is found to have a significant effect on defect formation. The size of bulging is reduced and the filling ability is improved with increased DTE.

Keyword: Cold embossing; Material flow pattern; Geometrical defect; Distance to edge.